Master's Thesis of Public Administration

Does Indonesia Stock Exchange Need Tick Size Reduction?

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ABSTRACT

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Indonesia Stock Exchange (IDX) has implemented new policies on January 6, 2014, which are changes in Lot Size and Tick Size. These instruments are expected to bring more liquidity to Indonesia Capital Market and in the end IDX can provide investment opportunities and sources of financing in order to support national economic development. This research explores the impact of an exogenous tick size reduction on bid-ask spreads, depths, and trade time on the Indonesia Stock Exchange. The sample period takes 24 months, which is 12 months before and 12 months after the tick rule change. We find that the impact of the tick reduction on the IDX is similar to that on other markets. Tick reduction on IDX is associated with declines in spread, volume and market depth (quote volume). We are unable to confirm significant effect on Trade Time and Quote to Trade ratio. Our cross-sectional regressions show that after the tick size reduction policy has been implemented, reduction in relative spread is significant. Stock with greater trading activity experienced greater spread reductions. However, we fail to find evidence of a significant impact of value, volume and price variables.

Key Words: Tick Size, Market Spread, Market Depth, Volume, Trade Time.

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1. INTRODUCTION

1.1. BACKGROUND OF THE STUDY

Indonesia Stock Exchange (IDX) has implemented new policies on January 6, 2014, which are changes in Lot Size and Fraction Price. Lot Size is the minimum trading unit that may be input in Regular market. While Price Fraction (Tick Size) means unit of price change used in performing selling offer or buying demand. (source: based on Trading Regulation, Rule Number II-A: Concerning Equity-Type Securities Trading) (Indonesia Stock Exchange, 2013).

There were five price scales for Tick Size before, which was changed into three scales. The price scale between Rp200,- (two hundred rupiah) up to less than Rp500,- (five hundred rupiah) is merged with the scale less than Rp200,- (two hundred rupiah), with minimum Tick Size is Rp1,- (one rupiah) and the maximum permitted price change is Rp20,- (twenty rupiah). And the price scale between Rp2.000,- (two thousand rupiah) up to less than Rp5.000,- (five thousand rupiah) is merged with the scale between Rp500,- (five hundred rupiah) up to less than Rp2.000,- (two thousand rupiah). Tick Size for this second scale is Rp5,- (five rupiah) and the maximum permitted price change is Rp100,- (one hundred rupiah). The last Tick Size for Price of Rp5.000,- (five thousand rupiah) or

more remains the same, which is Rp25,- (twenty five rupiah) and the maximum permitted price change is Rp500,- (five hundred rupiah);

Although change in Tick Size has been widely applied in various stock exchanges around the world, both at regional and international level, there are still some debate whether the Tick Size reduction can give benefit. Some scholars like (Hart, 1993) and (O'Connell, 1997), argue liquidity demanders will receive more benefit from Tick Size reduction as competition between liquidity providers is likely to force the bid-ask spread to reduce more. But others, such as (Grossman & Miller, 1988) and (Harris L. , Decimalization: A review of arguments and evidence., 1997), argue beside the benefits for liquidity demanders, it may not a good incentive for liquidity provider itself, since it could increase trade costs and reduce their willingness to provide liquidity in the end.

The debate about the benefits of these change, also occurs in Indonesia Stock Exchange. Before The Indonesia Stock Exchange (IDX) launched this changes, many investors complaint against this regulation implementation esp. the Tick Size changes. From their perspective this changes would make them more difficult to gain intraday (within daily base), because of the price range become wider. But The IDX argued that this change would give the advantage cause this would cut the waiting list to buy or sell the stocks.

This research is conducted to find out “Does this changes, esp. the Tick Size changes, could give benefit for the market and IDX ?”

PURPOSE STATEMENT

Generally, as seen in the introduction chapter above, this research is aimed at objective analysis of the change benefits and is conducted in a goal to seek knowledge as an end in itself but also as a means to an end. Even there are many researches in capital market trying to find the impact of Tick Size reduction, but it is a rare opportunity to examine the Tick Size impact on stock exchange in which the changes are not only the Tick Size but also its minimum trading unit. It is important to evaluate this regulation, since this could bring more benefit to attract more investors or otherwise this could become obstacle to gain profits. Wrong regulation could reduce IDX liquidity and discourage investor to leave the market. Although Indonesia population is more than 250.000.000, but ironically IDX investor is less than one percent of its population. It will be difficult for IDX to provide investment opportunities and sources of financing in order to support national economic development without correct regulations.

The specific aims and purposes of research are to describe, explain, prediction and understand the Tick Size changes impact on liquidity in Indonesia Stock Exchange, as described below:

a. Whether the Tick Size reduction policy could decreases cost component, which is reflected by the bid-ask spread.
b. How effective is the Tick Size changes in gaining the market depth, such as quote sizes, trading volume, and the extent of quote revisions.

c. Whether the Tick Size reduction decreases the trading execution time or speed up the trade time.

2. LITERATURE REVIEW

2.1. INDONESIA STOCK EXCHANGE

Indonesia Stock Exchange is one of the finest Stock Exchange in the world, in 2013 IDX has 483 Equity Issuers, Rp6.238,21 billion average daily stock trading value, and Rp4.219,02 trillion market capitalization. It also has a big growth among exchanges with 37,49% increase in average daily stock value and 28,46% in average daily stock trading volume (based on 2013 IDX Annual Report) (Indonesia Stock Exchange, 2013).

IDX has three markets, Regular Market with T+3 or 3 days settlement, Negotiation Market which the settlement is based on agreement between parties, and Cash Market with T+0 or settlement within the same day as the transaction. Regular market is the primary market in Indonesia Stock Exchange, because all the stock prices in other market are adjusted based on its stock price in Regular market.

Regular Market Trading in IDX takes place in five different sessions. Pre-Opening Session, Session 1 (Morning Session), Session 2 (Afternoon Session), Pre-Closing Session and Post-Trading Session. In Pre-Opening and Pre-Closing Sessions, JATS performs the call auction trading mechanism in which JATS performs the incurred formation process of Pre-opening Price and performs matching selling offer against buying demand on Opening Price or Closing

Price based on price and time priority. In the 1st and 2nd JATS performs matching continuously selling offer against buying demand continuous auction for the same Securities entirely or partially based on price and time priority. The trading mechanism in these sessions is called continuous auction mechanism. In Post Trading session, Securities Exchange Member can only order on Closing Price – which is formed in Pre-Closing session, and JATS performs matching continuously selling offer against buying demand for the same Securities entirely or partially based on Closing Price based on time priority. Unlike American Stock Exchange, IDX trading mostly order driven, no market maker, the liquidity is supplied by limit orders submitted electronically by public investor.

IDX vision is "To be a competitive and credible world-class exchange, and in order to achieve the vision, IDX has implemented many programs and infrastructure changes. One of the changes that has been implemented is changing the trading instruments such as Tick Size and Lot Size. These instruments are expected to bring more liquidity to Indonesia Capital Market and in the end IDX can provide investment opportunities and sources of financing in order to support national economic development.

2.2. TICK SIZE

Price Fraction (Tick Size) means unit of price change used in performing selling offer or buying demand. (source: based on

Trading Regulation, Rule Number II-A: Concerning Equity-Type Securities Trading) (Indonesia Stock Exchange, 2013).

On January 6, 2014, IDX changes Fraction Price or Tick Size. Tick Size reduction is different among the stocks, it is based on the Price Scales.

Table 1. Tick Size Rule Changes in Indonesia Stock Exchange on January 6, 2014

Price Scale	Tick Size		Group
	Before	After	
≤ Rp200	Rp1	Rp1	Group 1
Rp200 ≤ Rp500	Rp5	Rp1	Group 2
Rp500 ≤ Rp2.000	Rp10	Rp5	Group 3
Rp2.000 ≤ Rp5.000	Rp25	Rp5	Group 4
>Rp5.000	Rp50	Rp25	Group 5

2.3. LIQUIDITY

Many scholars has defined the liquidity as it is an important feature in Capital Market. (Garbade, 1982) defines Liquidity as depth and resiliency, which depth means adequate interest in both buy and sell sides to trade a big amount of transactions in short period of time,

and resiliency means compensating order flow when price change because of temporary order imbalance. (Cooper, Groth, & Avera, 1985) Cooper also states that liquidity of securities is the relationship between volume with price changes, and define the liquidity ratio, it is measured by calculating the volume dollar required to change the stock price 1% up and down. Other scholar like (Grossman & Miller, 1988) and (Harris L. , 2002), add immediacy factor in liquidity definition to see how much time spent to execute the trade of given size and given cost. (Harris L. , 2002) mentions there are three dimensions of liquidity to be considered by traders, which are immediacy, width and depth (time, cost and size). In liquid market, traders can trade big size at low cost in a short time. That is why liquidity is important for Exchanges, it can attract more investors and to add more trading volume and value.

There are many instruments that could affect the liquidity, it could increase or decrease the liquidity. One of the instruments is Tick Size.

2.3.1. TICK SIZE EFFECT ON LIQUIDITY

Many studies have been conducted to determine the impact of Tick Size reduction to the market. Some of them examine the Tick Size reduction in specific Exchanges and most of these studies focus on the impact to liquidity.

Stock Exchanges around the world have implemented smaller Tick Sizes in an objective to reduce costs of transaction and

promote trading activities, and some study have been developed to examine the impact in many exchanges that have implemented Tick Size reduction, here are some of the result of those study:

Table 2 Tick Size Reduction Impact on Market Liquidity

Exchanges	Impacts		
	Bid-Ask Spread	Quote Depth	Other
Tokyo Stock Exchange (Ahn, Cai, Chan, & Hamao, 2005)	Decrease	Decrease	• No significant increase in trading volume • the bid–ask spread declines more if the stock experiences a larger Tick Size reduction
Stock Exchange of	Decrease	Decrease	• as the

Exchanges	Impacts		
	Bid-Ask Spread	Quote Depth	Other
Singapore (Lau & Mclnish, 1995)			minimum Tick Size impose more severe truncation, the spread reduces more. • a reduction in the minimum Tick Size directs to a reduction in the aggregate quoted size of bids and asks

Exchanges	Impacts		
	Bid-Ask Spread	Quote Depth	Other
			displayed. • No significant change in Trading volume
Toronto Stock Exchange (Bacidore, 1997)	Decrease	Decrease	• No significant change in Trading Volume • Cross sectional analysis: the reduction in Tick Size leads the change in spreads

Exchanges	Impacts		
	Bid-Ask Spread	Quote Depth	Other
			significantly.
New York Stock Exchange (Goldstein & Kavajecz, 2000)	Decrease	Decrease	• Cumulative order book in limit order is decreased as well • No significant reduction
Thailand Stock Exchange (Pavabutr & Prangwattananon, 2008)	Decrease	Decrease	• No significant change in trading volume • Declines in accumulate

Exchanges	Impacts		
	Bid-Ask Spread	Quote Depth	Other
			d market depths

2.3.2. BID ASK SPREAD

Most of the studies that examine the Tick Size reduction impact on liquidity in the specific exchanges primarily focus on changes in the quoted of bids-asks spread and the quoted depth in the market. They believe that bid-ask spread is a cost component that is necessary to be reduced in order to attract the investor. According to (Harris L. , 2002) in spread, there are two components: First, Transaction cost spread factor or Transitory spread component as the price reversely changes regularly. Price changes caused by a jump from the ask to the bid most of the time followed by the changing of price that is caused by a jump from the bid to the ask. Such price changes happen when the order flow comprised by a mix of buyers and sellers. Second, The adverse selection spread component, is the additional widening spreads to cover traders losses to informed traders.

From the table 1, we can see that all of the studies above find that Tick Size reduction decreases the bid-ask spread and Quote

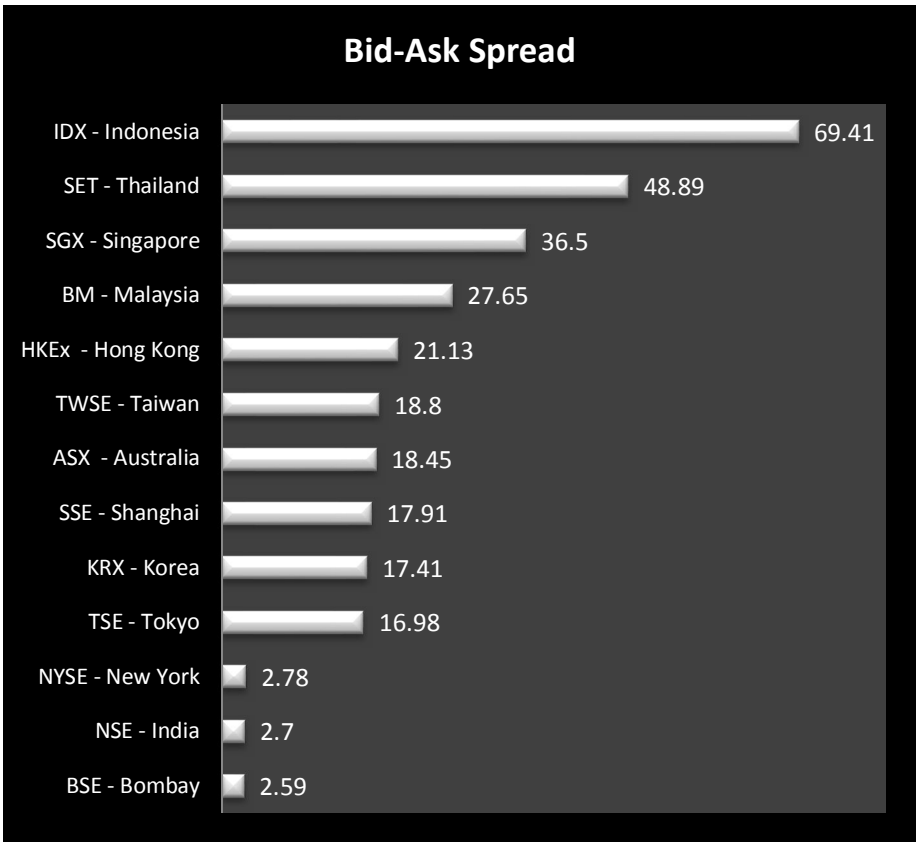
depth. As spread is considered as cost component, we can assume that trading cost becomes cheaper after Tick Size reduction. But on the other side, traders also get less profit because of it.

If we compare IDX spread to other exchanges, IDX has the biggest spread, as big spread is assumed as market constraint, by reducing the Tick Size, IDX expects the spread would decrease.

Table 3 Tick Size Scale Comparison

Exchanges Code	Tick Size Group	Tick Size Scale (Domestic Currency)	
		Minimum	Maximum
IDX	5	1	50
SET	8	0.01	2
SGX	3	0.001	0.01
BM	4	0.005	0.1
HKEX	11	0.001	5
ASX	3	0.001	0.01
KRX	7	1	1
TSE	11	1	100
NYSE	3	0.0001	0.01
NSE	1	0.05	0.05
BSE	2	0.01	0.05

Figure 1 Bid-Ask Spread Comparison



According to (Harris L. E., 1994), the minimum Tick Size should be positively related to the bid–ask spread.

The Tick Size is a price barrier to submit the order, it provides limited prices variation that traders can quote and this leads into limited quote strategies of limit order traders. Traders could not develop better bid or ask if the spread is only one tick.

If the minimum Tick Size is a binding restraint in posting quotes for liquidity providers, the Tick Size reduction will motivate competition in sending bid–ask quotes and cut the spread.

Hence, we explore the question of whether the Tick Size reduction decreases the bid-ask spread (question 1).

2.3.3. TICK SIZE AND DEPTH

How about the impact of Tick Size reduction to the quoted depth? Goldstein argues that the liquidity providers reaction to the minimum Tick Size reduction and its impact on spreads and depths is still vague (Goldstein & Kavajecz, 2000). First reaction that possible is that while liquidity providers submit less depth at the new, narrower quoted spread, they may continue to submit the same amount of liquidity at the previous prices. The Cumulative depth [1] [2] at a certain price will be unaffected, although the depth at the quoted spread will be decrease. On the other hand, liquidity providers could move their limit orders to further price from the quotes or, if their costs to supply the liquidity increase sufficiently, they decide leaving the market altogether. In the end, the quantity of liquidity providers could drop off overall, and triggering reduction not only the depth at the quoted bid and ask, but the cumulative depth as well. Thus, while smaller order sizes than the quoted depth could get benefit from the spreads reduction, orders with larger size than the quoted depth could become

1 Cumulative depth at certain price is sum of the depth for all limit orders up to and including that price

[2] Cumulative depth at a certain price is calculated by summing up all of the shares available at that price or better.

more expensive as they could be forced to consume into the order book limit to find adequate liquidity to cover the cost. The remaining questions is whether the reduction in Tick Size will produce sufficient changes in the cumulative depth to increase costs for orders with large size while also deducting costs for the smaller size order.

The higher buy price correlated with a higher bid should be for a smaller quoted size, and the lower sales price correlated with the lower ask should also be for a smaller quoted size (Harris L. , Stock Price Clustering and Discretness, 1991). But considering the Lot Size reduction, that could increase the volume as (Amihud, Mendelson, & Uno, 1999) find that the reduction in the Minimum Trading Unit (Lot Size) at the Tokyo Stock Exchange is associated with an increase in trading volume and in liquidity, measured, using daily data, by Amihud's liquidity ratio. According to this, we investigate whether the Tick Size reduction leads to a increase in the quote sizes for best bid-ask (question 2).

Trading volume is related to quote depth variable. According to (Ahn, Cao, & Choe, Tick Size, Spread and Volume, 1995) Intuitively, the trading cost is related to trading volume negatively. As a compulsory minimum price variation causes stock trading unnecessarily expensive by expanding the spread, it push trader and investors to submit order less than they otherwise would. Hence, a reduction in Tick Size is expected to

increase trading volume. Another impact on trading volume, the reduction in the Tick Size also causes the provision of liquidity less profitable (Harris L. E., 1994). Thus, liquidity suppliers such as market makers are unwilling to trade more. Furthermore (Anshuman & Kalay, 1998) mentions, a smaller Tick Size will rise the probability to trade with informed traders resulting a reduction in Tick Size is likely to decrease the trade volume.

Although all the studies in the exchanges above also couldn't find significant increase in trading volume, but since the reduction in Tick Size in IDX is accompanied by the Lot Size changes which means the expensive stock become more affordable, we investigate whether this changes will increase the trading volume (question 3).

Alternative effect of Tick Size reduction is liquidity suppliers could be more aggressive in posting quote. The Tick Size limits the quote prices that traders submitted and consequently limit the quote The Tick Size is a price barrier to submit the order, it provides limited prices variation that traders can quote and this leads into limited quote strategies of limit order traders. Traders could not develop better bid or ask if the spread is only one tick. With a smaller Tick Size, limit order traders become easier to step further over another traders in a limit order market. Chung and Chuwonganant (Chung & Chuwonganant, 2002) show that after the tick-size is reduced from $1/8 to $1/16 the in New York Stock Exchange number of quote revisions that involve

changes in the spread rise significantly. To investigate this possibility, we therefore compare the changes of quote revisions before and after the minimum Tick Size reduction (question 4).

2.3.4. TRADE TIME

None of the previous studies mentioned above has explored the impact on execution time, but since the wider range provide more pricing options, quotation will be scattered and cut the order queue. Based on the IDX Research Report, as the Tick Size reduction increases the number of price variations, the trading execution time could be shorten –queuing order decrease- and enable trader to put more order (Indonesia Stock Exchange, 2012). Hence we explore whether the Tick Size reduction decreases the trading execution time (question 5).

2.3.5. CROSS SECTIONAL REGRESSION

To give emphasis whether the spread change affects liquidity, we do the cross-sectional regression applying the model from Harris . (Harris L. E., 1994). With this regression model we examine the determinants of relative spread. We would like to know under what condition the Tick Size is effectively affect the investor and change their behavior on posting the spread.

$$Rel\ Spread_i = \alpha + \beta_1 DummyYear_i + \beta_2 LogAvePrice_i + \beta_3 LogAveDayVol_i + \beta_4 LogAveDayValue_i + \beta_5 LogAveNTrade_i$$

$Rel\ Spread_i$= average bid-ask spread expressed as a percentage of price

$Dummy_i$=dummy variable for year period, defined as 0 for period before Tick Size reduction and it is defined as 1 for period after Tick Size reduction.

$LogAvePrice_i$= Log of average price over sample Period

$LogAveDayVol_i$= Log of average daily volume

$LogAveDayValue_i$= Log of average daily value

$LogAveNTrade_i$=Log of Frequency or Number of Trade

We use the relative spread as the dependent variable because it measures transaction costs per dollar of investment. There are five explanatory variables, dummy for before and after period, the average of daily volume, the average of daily value, the average of price and the average of number of trades or frequency. Dummy variable is a modification variable of Harris regression model in this research. We predict that after Tick Size reduction policy has been implemented, the relative spread will be decreased.

Regarding to Harris model, we predict that trading activity coefficient (Number of trade, daily volume and market value) is

negative as for active stocks, because minimum price variation is a binding constraint on absolute spread. Cost of market making will be shared among active traders, so spread will be reducing more when trading activity is high. Simple demand theory suggests smaller spreads will be associated with larger volumes. (Harris L. E., 1994) Since market maker profits are some rough function of the relative spread times the stock of dollar volume, a change in trading rule could expand their profits if it increases volume by a larger percentage than it decreases the spread. Moreover the bid-ask spread is also expected to be lower for stock with lower price, as a lower price stock has a larger "effective" Tick Size. (Question 6)

3. DATA AND METHODOLOGY

3.1. DATA SAMPLE

As noted above, the decision to reduce the minimum Tick Size was implemented by IDX on January 6, 2014. This decision affected for all stock listed on stock exchange. The data for the study are collected by obtaining the real-time IDX trades data named Exchange Trade Data (Daftar Transaksi Bursa - DTB) and quote order data from Operational Trading Division in IDX historical tick data. The DTB reflects all the trade and quote information broadcast to IDX members by IDX.

The sample period takes 24 months from January 2, 2013 to December 30, 2014 which is 12 months before and 12 months after the tick rule change. There are 246 trading days during the pre-event period (January 2, 2013 to January 3, 2014) and 240 Trading days during the post-event period (January 6, 2014 to December 30, 2014). The new Tick Size rule applies uniformly for all stocks listed on the IDX, and new Tick Size scale is also changed. Therefore, we classify the entire stocks sample into several groups based on their respective price scale categories. The test sample consists of groups of stocks that prices belong to the categories where the new tick rule applies. In our test, there is also a control group that consists of groups of stocks in price categories where the new rule does not apply. The test

sample include groups stocks price between Rp200,- up to less than Rp500,- (Group 2), between Rp500,- up to less than Rp2.000,- (group 3), between Rp2.000,- up to less than Rp5.000,- (group 4), above Rp5.000,- (group 5). And the control group is stocks price less than Rp200,- (group 1).

Table 4 Tick Size Group Sample

Price Scale	Tick Size		Group
	Before	After	
≤ Rp200	Rp1	Rp1	Group 1
Rp200 ≤ Rp500	Rp5	Rp1	Group 2
Rp500 ≤ Rp2.000	Rp10	Rp5	Group 3
Rp2.000 ≤ Rp5.000	Rp25	Rp5	Group 4
>Rp5.000	Rp50	Rp25	Group 5

For each firm in the test sample during the pre- or post-event[3] period, only if the stock is traded and at least has one transaction with its intraday highest and lowest trade prices are within its price scale criteria, a trading day will be counted. We include only those firms with at least 120 valid trading days for both the pre- and post-event periods. We exclude data from Cash Market and Negotiation Market,

[3] Tick Price reduction event is on January 6th, 2014

we only use Regular Market data which is used for calculate the index and other market parameter standard.

3.2. METHODS AND HYPOTHESIS

3.2.1. THE SPREAD

In this study we examine the spread using two methods, first is Quoted Spread which is defined difference between the lowest quoted price ask and the highest quoted bid price.

Quote Spread = Ask Price – Bid Price

We calculate the closing quoted spreads on each day for both the test and control group samples. Calculate the quoted bid–ask spread as a measure of trading cost or spread component, we assume that a trade always hits either the bid or the ask price. In IDX, market orders are allowed to cross with each other. This happens mostly when there are a lot of market orders available in the market. Broker will hits his customers' orders (cross trade), especially for block trades. That is why it is possible to trade inside the spread for those market orders cross trade. We calculate the Effective Spread to measure the actual transaction cost that spent by liquidity demander. The Effective Spread is used to account the possibility that trades sometimes happen inside the quoted spread.

The effective spread is defined as: $2|p_t - q_t|$

where p_t is the transaction price and q_t is the midpoint of the prevailing quote at the time of the trade.

When calculating the Spread, we only use closing quotes for all stocks and exclude stock which was

1. Not listed in 2013 or 2014 (IPO or delisting);
2. Being traded less than 120 days in 2013 or 2014;
3. Not move to another group due to the price changing or corporate action (such as reverse stock or stock split);

From this spread calculation we expect that the Spread will decrease as Tick Size reduction impact. Based on (Harris L. E., 1994) reduction in Tick Size will encourage competition in posting bid–ask quotes and this would decrease the spread.

Hypothesis 1: Tick Size reduction decreases the Market Spread; Quote Spread and Effective Spread

3.2.2. THE DEPTH

In order to explore the Tick Size reduction in market depth, we use Volume and Volume Quote in best bid and ask. Beside volume and volume quote we include the quote revision as dependent variable of this changes. To investigate whether the tick size reduction will induce trader to submit the order more

often, we compare the size of quote revision before and after the reduction. we then calculate the quote to trade ratio by dividing the number of quotes by the number of trades.

$$\text{Quote-to-trade ratio} = \frac{\text{Number of Quotes (Order)}}{\text{Number of Trades}}$$

We exclude the opening and closing trades and the quotes before the opening trade and after the closing trade for Volume Quote.

Though other studies find that Tick Size reduction doesn't increase the Quote Depth, like Harris says that low price of sales associated with the lower ask should also be for a smaller size quote size (Harris L. , Stock Price Clustering and Discretness, 1991). Ahn, Cao and Choe also highlight that the trading cost has negative relation with trading volume (Ahn, Cao, & Choe, Tick Size, Spread and Volume, 1995). As a compulsory minimum price variation causes stock trading unnecessarily expensive by expanding the spread, it push trader and investors to submit order less than they otherwise would. Furthermore Anshuman and Kalay mentions, a smaller Tick Size will rise the probability to trade with the informed traders, and resulting a reduction in market depth as the Tick Size is reduced (Anshuman & Kalay, 1998). The IDX changes include the Lot Size reduction, which makes trader able to buy stock in smaller

amount. This change could give different impact for the Market Impact, consistent with Amihud, Mendelson and Uno as mentioned earlier who discover that the reduction in the Lot Size is relate with an increase in trading volume and in liquidity (Amihud, Mendelson, & Uno, 1999).

Hypothesis 2: Tick Size and Lot Size reduction increase the Market Depth (Quote Volume), Volume, and Quote-to-trade ratio.

3.2.3. TRADE TIME

One of the purposes of this change is to cut the order queue, it means that investor could execute the order faster. Calculation of this Trade Time use time of the trade minus time of the order.

Trade Time = Time of the trade – Time of the order

In example. The time of the order is 10.00.00 am and time of the trade is 10.45.55 am, it means the Trade Time is 45 minutes 55 seconds. Since the Opening and Closing Session use call auction methods not continuous auction, we exclude those two sessions data. As the Tick Size reduction increases the number of price variations, the trading execution time could be shorten –queuing order decrease- and enable trader to put more order.

Hypothesis 3: Tick Size and Lot Size reduction decreases the Trade Time

3.2.4. CROSS SECTIONAL REGRESSION

To observe whether the stocks with greater trading activity, and lower prices are likely to have lower spread or not, we do the regression analysis model from Harris . (Harris L. E., 1994).

$$Rel\ Spread_i = \alpha + \beta_1 DummyYear_i + \beta_2 LogAvePrice_i + \beta_3 LogAveDayVol_i + \beta_4 LogAveDayValue_i + \beta_5 LogAveNTrade_i$$

$Rel\ Spread_i$= average bid-ask spread expressed as a percentage of price

$Dummy_i$=dummy variable for year period, defined as 0 for period before Tick Size reduction and it is defined as 1 for period after Tick Size reduction.

$LogAvePrice_i$= Log of average price over sample Period

$LogAveDayVol_i$= Log of average daily volume

$LogAveDayValue_i$= Log of average daily value

$LogAveNTrade_i$=Log of Frequency or Number of Trade

We predict that stocks with greater trading activity, lower prices are likely to experiences greater spread reduction.

Hypothesis 4: The stocks with greater trading activity, lower prices are likely to have lower spread after the Tick Size reduction policy.

3.3.STATISTICAL TEST

After we calculate the bid-ask spread, Volume, Quote Volume, Quote to trade ratio, and Trade time, we can compare the magnitude changes of average (Mean and Median) and see the changes between:

a. Control Group (Group 1) and test group (Group 2,3,4,5).
b. Before and After period of Tick Size reduction

To examine the impact of tick price reduction the different for each variables before and after changes period we use Wilcoxon rank-sum test. Although it is more common to perform F Test or Analysis of Variance (ANOVA) which is an inferential method that is used to test the equality of three or more population means. But in this research we use the Wilcoxon rank-sum test. It is a nonparametric test, an alternative to the two- sample t-test. As the samples data in IDX are mostly have non-normal distribution, Wilcoxon test will give more valid and reliable results. While the F-test is more reliable under the normality assumption, the Wilcoxon test is more recommended when the data distribution of the test statistic is non-normal.

Then we use regression analysis to predict factors that influence investor to post the spread. Whether the Tick Size reduction rule, trading activity, volume and price (as Harris model) have impact on the Spread variable, and by how much each of this variables impact the Spread.

4. DATA ANALYSIS AND FINDINGS

In this chapter the results of the data analysis are presented. The data were collected and then processed in response to the problems posed in chapter 1 of this thesis.

4.1. THE SPREAD

Based on the criteria which has decided above in Chapter 3:

1. Stock is listed in 2013 or 2014 (IPO or delisting);
2. Stock is traded more than 120 days in 2013 or 2014;
3. Stock didn't Move to another group due to the price changing or corporate action (such as reverse stock or stock split in 2013-2014);

We first test the quoted bid–ask spread, which is defined as the difference between the lowest ask price and the highest bid price of the prevailing quote. (Ahn, Cai, Chan, & Hamao, 2005)

We examine the change in spread, market depth and volume after the tick size reduction rule implemented. According to Harris (Harris L. E., 1994), the minimum Tick Size should be positively related to the bid–ask spread. As the Tick Size determine the lower limit or for the quoted bid–ask spread, liquidity providers could not expand the spread when it is only one tick. If the minimum Tick Size is a binding restraint in posting quotes for liquidity providers, the Tick

Size reduction will motivate competition in sending bid–ask quotes and cut the spread.

In this examination we choose to analyze data using Wilcoxon Test, because after normal distribution test, we found the spread data is not normally distributed. If the normal distribution assumptions are violated then we shouldn't use the within-subjects t test. As an alternative we use the Wilcoxon signed-rank test, which is a nonparametric test. Nonparametric tests do not estimate the data distribution by using specific parameters (such as the mean and standard deviation), and they have assumptions, which are less severe compared to parametric tests. The Wilcoxon signed-rank test does not assume that our variables have normal distributions. It also does not assume the two variables have the same variance.

Table 5 summarizes the statistical test findings of Quote spreads for five groups of stocks surrounding the implementation of the Tick Size change on the IDX.

Table 5 The Quote Spread Before and After Tick Size Changes

Quote Spread in Rupiah			
	Pre (2013)	Post (2014)	Z Statistic (p value)
Group 1 (≤Rp200)			
Median	2.32	2.02	-1.591(p = .112)

Group 2 (Rp200 ≤ Rp500)			
Median	6.62	3.78	-3,732(p = .000)
Group 3 (Rp500 ≤ Rp2.000)			
Median	13.68	7.83	-3.665(p = .000)
Group 4 (Rp2.000 ≤ Rp5.000)			
Median	58.4	42.34	-0.606(p = .544)
Group 5 (>Rp5.000)			
Median	169.41	95.28	-2.53(p = .011)

Table 6 The Effective Spread Before and After Tick Size Changes

Effective Quote Spread in Rupiah			
	Pre (2013)	Post (2014)	Z Statistic (p value)
Group 1 (≤Rp200)			
Median	2.23	2.13	-1.49 (p = .136)
Group 2 (Rp200 ≤ Rp500)			

Median	6.47	3.89	-3.715 (p = .000)
Group 3 (Rp500 ≤ Rp2.000)			
Median	13	7.68	-2.853 (p = .004)
Group 4 (Rp2.000 ≤ Rp5.000)			
Median	56.57	39.5	-0.794 (p = .427)
Group 5 (>Rp5.000)			
Median	154.74	92.87	-2.690 (p = .007)

On the first table, we present the quoted spread and the second table represents the effective spread quote. For the control groups (Group 1) where there is no reduction of the Tick Size, the spread median decreased but we could not say that the spread of group 1 significantly decreases because p value is more than 0.05.

For the test groups which experiences the minimum Tick Size is changed, the decreases in quoted spread are larger. For the stocks in Group 2 (Rp200 ≤ Rp500) where the Tick Size is reduced from Rp5 to Rp1, the median quoted spread is reduced from Rp6.62 to 3.78 significantly decrease under α 0.05. For the stocks in Group 3 (Rp500 ≤ Rp2.000) where the Tick Size is reduced from Rp10 to

Rp5, the median of quoted spread is also reduced significantly from Rp13.68 to 7.83 (α 0.05). For the stocks in Group 5 (>Rp5.000) where the Tick Size is reduced from Rp50 to Rp25, the spread again significantly decrease from the average quoted spread is reduced from Rp169,41 to Rp95,28 (α 0.05).

We could not find significant changes/ reduction of spread only in group 4. Beside group 2, Tick Size reduction of group 4 is also -80%, compare to other group trader/investor in this group face the biggest reduction in profit. While lowering the bid–ask spread reduces the trading cost for investors, on the other hand, this will also mean reduction of their profits.

In table 7, we calculate the minimum profit percentage which is received by seller, here we can see that in Group 4 trader/Investor in this group will get the lowest profit percentage compare to other group, in this case we assume that in order to keep their profit, they do not change their quote price following the Tick Size reduction.

Table 7 Profit Percentage Before and After Tick Size Changes

Group	Price Scale	Tick Size			Profit Percentage	
		Before	After	Change	Before	After
Group 1	≤ Rp200	Rp1	Rp1	0%	2%	2%

Group 2	Rp200 ≤ Rp500	Rp5	Rp1	-80%	2,5%	0,5%
Group 3	Rp500 ≤ Rp2.000	Rp10	Rp5	-50%	2%	1%
Group 4	Rp2.000 ≤ Rp5.000	Rp25	Rp5	-80%	1,25%	0,25%
Group 5	>Rp5.000	Rp50	Rp25	-50%	1%	0,5%

The result is consistent with the prediction of Harris (1994) when the Tick Size change the spread declines significantly, this might suggest that traders submit order and fill in the new price combination after the constraints on Tick Size are relaxed.

Calculate the quoted bid–ask spread as a measure of trading cost or spread component, we assume that a trade always hits either the bid or the ask price. In IDX, market orders are allowed to cross with each other. This happens mostly when there are a lot of market orders available in the market. Broker will hits his customers' orders (cross trade), especially for block trades.

We calculate the Effective Spread to measure the actual transaction cost that spent by liquidity demander. The Effective Spread is used to

account the possibility that trades sometimes happen inside the quoted spread.

The effective spread is defined as $2|p_t - q_t|$,

In the 6 we could see the effective spread before and after the implementation of the Tick Size change on the IDX. The effective bid–ask spreads are lesser than the quoted bid–ask spreads for all different groups, because mostly trades are occurred at the bid or the ask price.

Based on the Wilcoxon rank sum test, the declines in these groups are significantly different from the changes in the control groups, the spread is lower significantly in group 2,3 and 5. The results for percentage effective spreads are similar. Overall, the evidence indicates there is a decline in actual trading costs paid by investors.

4.2. MARKET DEPTH

4.2.1. TRADE VOLUME AND ORDER VOLUME

The analysis in the previous section suggests that the trading cost as measured by the quoted spread and effective spread decreases in the IDX after the Tick Size reduction. While lowering the bid–ask spread reduces the trading cost for investors who submit market orders matched at the best quoted prices, this will also reduce the liquidity provider profits so that they are no longer willing to provide liquidity as much as before. For those reason, Tick Size reduction will also

lower quoted depth, not only lower the bid–ask spread, Using data from NYSE, Goldstein and Kavajecz record that both depths and spreads decline after the Tick Size is decreased. (Goldstein & Kavajecz, 2000).

We examine two volume measures: trade volume, and quote volume (depth). Since sample data for volume measures are skewed we also run the Wilcoxon signed tanks test, Results are reported in Table 8 and Table 9.

Table 8 The Trade Volume Before and After Tick Size Changes

Trade Volume			
	Pre (2013)	Post (2014)	Z Statistic (p value)
Group 1 (≤Rp200)			
Median	858,430.96	752,191 (Change -12,37%)	-2.826 (p = .005)
Group 2 (Rp200 ≤ Rp500)			
Median	1,531,155.74	649,424.20 (Change -57,58%)	-4.029 (p = .000)
Group 3 (Rp500 ≤ Rp2.000)			
Median	2,335,098.36	1,309,016.53 (Change -43,49%)	-4.49 (p = .117)
Group 4 (Rp2.000 ≤ Rp5.000)			
Median	761,411.88	181,422.52 (Change -76,17%)	-3.045 (p = .002)
Group 5 (>Rp5.000)			
Median	1.217.785.86	1.169.789.26 (Change -3,941)	-2.487 (p = .013)

Table 9 The Quote Volume Before and After Tick Size Changes

Quote Volume			
	Pre (2013)	Post (2014)	Z Statistic (p value)
Group 1 (≤Rp200)			
Median	48,116.53	35,227.39 (Change -26,78)	-3.882 (p = .000)
Group 2 (Rp200 ≤ Rp500)			
Median	42,420.12	25,967.70 (Change -38,78%)	-5.701 (p = .000)
Group 3 (Rp500 ≤ Rp2.000)			
Median	36,060.06	28,455.41 (Change -21,08)	-5.528 (p = .000)
Group 4 (Rp2.000 ≤ Rp5.000)			
Median	14,932.33	8,122 (Change -45,60%)	-4.995 (p = .000)
Group 5 (>Rp5.000)			
Median	5,433.75	4,105.70 (Change -24,44)	-4.503 (p = .000)

The overall evidences present no significant increase in volume for all groups. Instead of increasing, The control group and test group, experience volume reduction in 2014. Compare to group 1 and 5, the

other three groups: Group 2, 3, and 4 experience the most significant reduction. According to the trade volume result, there are no significant proves that the trading volume increases after Tick Size reduction. Consistent with Ahn., et all that (Ahn, Cao, & Choe, Tick Size, Spread and Volume, 1995) and (Bacidore, 1997) who find that in Toronto Stock Exchange after tick size reduction or decimalization, there is no increase in trading volume.

Therefore, despite the narrowing of the spreads, the trading volume does not increase. The reason is that profit of the liquidity providers will be reduced when the trading cost for investors gets lower (trading cost which represents in the bid–ask spread component becomes narrow). Next, liquidity provider will reduce the number of shares in the quotation when the profit decreased. Therefore, when the bid–ask spread decrease, this is not followed by an increasing in trading activity.

4.2.2. QUOTE TO TRADE

Another result of the reduction in Tick Size reduction is that the liquidity providers are able to become more aggressive in posting the order. The Tick Size is a price barrier to submit the order, it provides limited prices variation that traders can quote and this leads into limited quote strategies of limit order traders. Traders could not develop better bid or ask if the spread is only one tick. With a smaller Tick Size, limit order traders become easier to step further over

another traders in a limit order market. Chung and Chuwonganant (Chung & Chuwonganant, 2002) show that after the tick-size is reduced from $1/8 to $1/16 the in New York Stock Exchange number of quote revisions that involve changes in the spread rise significantly. To investigate Chung research finding, we compare the revision amount of quote. Since the quote revision could be affected by the intensity of trading activity, we measure the quote-to-trade ratio by dividing the number of quotes by the number of trades.

Table 10 The Quote Volume Before and After Tick Size Changes

Quote to Trade ratio			
	Pre (2013)	Post (2014)	Z Statistic (p value)
Group 1 (≤Rp200)			
Median	5.41	6.79	-2.202 (p = .028)
Group 2 (Rp200 ≤ Rp500)			
Median	5.49	4.78	-1.470 (p = .141)
Group 3 (Rp500 ≤ Rp2.000)			
Median	3.22	2.9	-1.566 (p = .117)
Group 4 (Rp2.000 ≤ Rp5.000)			
Median	2.78	3.14	-.131 (p = .896)
Group 5 (>Rp5.000)			
Median	2.35	2.07	-2.864 (p = .004)

It is only Group 1 or the Control group, which significantly increases in Quote to Trade ratio. Although quote to trade ratio for group 4 also slightly increase, but the p value show no significant result. Then Quote to Trade ratio of group 2, 3 and 5 significantly decline. This finding is consistent with the other two market depth variables which shows no growth in market depth after Tick Size change. The result suggests that trader and liquidity provider do not eagerly submitting order using the new tick size. This finding confirms Ahn, Cao and Choe study result, which concludes that that the cost of trading is related to trading volume negatively (Ahn, Cao, & Choe, Tick Size, Spread and Volume, 1995) As a compulsory minimum price variation causes stock trading unnecessarily expensive by expanding the spread, it push trader and investors to submit order less than they otherwise would. Consequently, a reduction in Tick Size is likely to reduce not only the market depth and volume but also the trading activity.

4.2.3. TRADE TIME

The size of Tick Size could impact the trade time. As Cordella mentions that the speed of the buy and sell orders convergence is determined by the frequency with which dealers check their offers and by the Tick Size. (Cordella, 1999) When IDX consider to lower the Tick Size, They expect that it will cut the quote queue line and

shorten the trade time, but we find the opposite result in the Table 11 and 12.

Table 11 Trade Time (Sell) Before and After Tick Size Changes

Sell Time			
	Pre (2013)	Post (2014)	Z Statistic (p value)
Group 1 (<Rp200)			
Median	0:29:04	0:28:38	-.179 (p = .858)
Group 2 (Rp200 < Rp500)			
Median	0:29:27	0:27:43	-1.330 (p = .184)
Group 3 (Rp500 < Rp2.000)			
Median	0:28:16	0:23:43	-.046 (p = .964)
Group 3 (Rp2.000 < Rp5.000)			
Median	0:28:20	0:24:34	-.730 (p = .465)
Group 5 (>Rp5.000)			
Median	0:30:40	0:24:31	-3.400 (p = .001)

Table 12 Trade Time (Buy) Before and After Tick Size Changes

Buy Time			
	Pre (2013)	Post (2014)	Z Statistic (p value)
Group 1 (<Rp200)			
Median	0:23:44	0:23:01	-1.542 (p = .123)
Group 2 (Rp200 < Rp500)			
Median	0:26:29	0:20:50	-1.481 (p = .139)
Group 3 (Rp500 < Rp2.000)			
Median	0:26:11	0:23:32	-1.412 (p = .158)
Group 3 (Rp2.000 < Rp5.000)			
Median	0:29:32	0:25:16	-1.250 (p = .211)
Group 5 (>Rp5.000)			
Median	0:28:08	0:29:13	-.514 (p = .607)

We find that trade time, for both side -buyer and seller, does not improve or decline significantly. Only Group 5 that shows a significant sell trade time lessening.

As Cordella says that decrease in the Tick Size interpret as a lower profit at the competitive price and decreases the attractiveness of this offer, and as a result, dealers are less desired to submit the competitive price soon, in order to lock in a certain profit. (Cordella, 1999)

Actually as the Tick Size increases, time to adjust the price to the competitive price decreases. Large tick size will make a bigger wedge between the expected value and the competitive price. This motivates the dealer to post competitive price faster and consequently the trade time or the convergence to trade price become more quickly. This short adjustment price means that the larger tick size does not always mean a larger trading cost for liquidity demander. In fact, according to Cordella, the Tick Size which minimize the expected trading cost is always strictly greater than zero. (Cordella, 1999)

As the Tick Size gets closer to zero, the profit obtained by submitting the competitive price becomes smaller and smaller. Together with this, the number of possible offers for the dealers becomes bigger and bigger. This two combination effects indicates that the adjustment time needed for the best price to grasp the competitive price becomes infinite, as the Tick Size gets closer to zero. This two gives explanation why the Tick Size reduction does not always cut the trade time.

4.2.4. CROSS-SECTIONAL REGRESSION

Using the Harris Spread Regression Model, we examine the determinants of the change in the relative spread or cost per dollar investment. By running his model, we can see whether IDX rule change will impact more for actively traded stock, as Harris (Harris

L. E., 1994) predict that exchange rule change on spread is more likely to bind actively traded stocks than infrequently traded ones.

Since Harris predicts that active traded stock will be affected the most by the Tick Size change, we perform the regression for actively traded stock which are listed as IDX30. The IDX30 consists of stocks with the biggest market capitalization included in the LQ45, which covers the IDX's most liquid stocks. The IDX30 is expected to be a reference for investors, who want to invest in stocks in companies with high liquidity and big capitalization. Since IDX performs reviews every six months to determine which stocks will be included in the IDX30. We only choose 22 stocks which are included in both 2013 period (February to July 2013 and August 2013 to January 2014). Stocks included in this model are:

Table 13 Cross Sectional Regression Samples

No.	Stock Code	Companies Name
1.	ASII	Astra International Tbk.
2.	ASRI	Alam Sutera Realty Tbk.
3.	BBNI	Bank Negara Indonesia (Persero) Tbk.
4.	BBRI	Bank Rakyat Indonesia (Persero) Tbk.
5.	BDMN	Bank Danamon Indonesia Tbk.
6.	BKSL	Sentul City Tbk.
7.	BSDE	Bumi Serpong Damai Tbk.

No.	Stock Code	Companies Name
8.	CPIN	Charoen Pokphand Indonesia Tbk
9.	EXCL	XL Axiata Tbk.
10.	HRUM	Harum Energy Tbk.
11.	ICBP	Indofood CBP Sukses Makmur Tbk.
12.	INTP	Indocement Tunggal Prakarsa Tbk.
13.	JSMR	Jasa Marga (Persero) Tbk.
14.	KLBF	Kalbe Farma Tbk.
15.	MAIN	Malindo Feedmill Tbk.
16.	MLPL	Multipolar Tbk.
17.	PGAS	Perusahaan Gas Negara (Persero) Tbk.
18.	PTBA	Tambang Batubara Bukit Asam (Persero)
19.	SMGR	Semen Indonesia (Persero) Tbk.
20.	SSIA	Surya Semesta Internusa Tbk.
21.	TLKM	Telekomunikasi Indonesia (Persero)
22.	WIKA	Wijaya Karya (Persero) Tbk.

Regression Model:

$$Rel\ Spread_i = \alpha + \beta_1 DummyYear_i + \beta_2 LogAvePrice_i + \beta_3 LogAveDayVol_i + \beta_4 LogAveDayValue_i + \beta_5 LogAveNTrade_i$$

$Rel\ Spread_i$= average bid-ask spread expressed as a percentage of price

$Dummy_i$=dummy variable for year period, defined as 0 for period before Tick Size reduction and it is defined as 1 for period after Tick Size reduction.

$LogAvePrice_i$= Log of average price over sample Period

$LogAveDayVol_i$= Log of average daily volume

$LogAveDayValue_i$= Log of average daily value

$LogAveNTrade_i$=Log of Frequency or Number of Trade

Table 14 Cross Sectional Regression of Relative Spread on Variables Representing Stock Characteristics

Dependent Variable (Y)	α	B_1	B_2	B_3	B_4	B_5	Adj. R^2
Relative Spread (t stat)	1.047 (1.00)	-.343 (-4.03)	-.758 (-1.1)	-.382 (-0.55)	.691 (0.96)	-.679 (-2.08)	.762

Table 14 represents cross sectional regression, in those regression, the dependent variable is relative spread. The estimated coefficient (t-stat.) of the five explanatory variables, dummy variable for year period, Log of average price over sample Period, Log of average daily volume, Log of average daily value, and Log of Frequency or Number of Trade are 1.047(1.00), -.343(-4.03), -.758(-1.1), -.382(-0.55), .691(0.96), -.679(-2.08)

Only dummy variable and trading activity that's significantly impact the relative spread. The direction of prediction also consistent with Harris predictions, minimum price variation is more likely to bind actively stocks than infrequently traded ones. Dummy variable shows that after Tick Size rule being implemented, relative spread in active stock is reduced.

But our finding shows no significant impact of price, value and volume on relative spread. The result is different from Harris findings (Harris L. E., 1994), whose finds that the stock price level could explain variation of bid-ask spread. Because the tick size varies across different stock price criteria, the price level is not significant as before, this is becomes minor.

4.2.5. CORRELATIONS AMONG REGIONAL INDICES

This section is added to examine whether after Tick Size reduction Indonesia capital market will be less affected by the international markets or not.

In the present study, we use both daily series for the 6 indices from the markets of 6 different countries that is considered to have big correlation with Indonesia Capital Market. The indices data are between 2nd of January 2013 and 30th of December 2014. The data is taken from Yahoo Finance list of index, country of origin consist of:

1. KLSE Index – Malaysia
2. STI Index – Singapore
3. SET Index – Thailand
4. Hang Seng Index – Hong Kong
5. NIKKEI Index – Japan

The daily series contain 244 days of index for each country in 2013, and 241 daily index in 2014.

Table 15 Regional Index Correlation

	Index KLSE	Index STI	Index Hang Seng	Index SET	Index NIKKEI
Index IHSG 2013	-.25**	.82**	-.36**	.91**	-.20**
Index IHSG 2014	.13*	.86**	.81**	.88**	.57**

**. Correlation is significant at the 0.01 level (2-tailed)

*.Correlation is significant at the 0.05 level (2-tailed)

Because the index data not all are normally distributed and highly skewed, violating the assumption of normality, we use th Spearman's rho to test the correlation between regional index.

Since Tick Size reduction will increase the price grid, we expect that correlation between index in regional is negative. Negatively correlated holdings can "smooth" the equity curve and reduce risk. When one falls, the other likely will gain to some extent and offset the drop partially or fully. Reducing the chances for a severe drop in value is an important element of risk reduction. Moreover, the relevance for investing is that highly correlated instruments do not provide much diversification.

From the correlation analysis we find mixed result regarding regional index correlation. The correlation coefficient between IHSG and 2 index: Index KLSE SET reduced slightly in 2014. On the other hand the correlation coefficient between IHSG and 3 other indexes: STI, Hang Seng and Nikkei are improves significantly in 2014. We couldn't associate the index correlation coefficient with the Tick Size reduction regulation.

5. SUMMARY AND POLICY IMPLICATION

5.1.SUMMARY

This study has presented an evaluation of stock exchange policy to ensure that this policy could bring more benefit to attract more investors or otherwise this could become obstacle to gain profits.

The statistical methods we used to evaluate Tick Size policy in this research is quantitative analysis, by using variance analysis and regression, we investigate the Tick Size reduction policy impact to market liquidity (cost, volume and immediacy).

After performing the statistical analysis, we find that the reduction in the minimum Tick Size resulted in:

1) A reduction in bid-ask spreads and an economically significant decrease in transactions cost as measured by spread component. Consistent with the prediction of Harris (1994, (Harris L. E., 1994) the change has reduced both quoted and effective spreads.
2) Daily volume and size or volume quote falls uniformly for all stocks in our sample.
3) Our cross-sectional regressions show that after the Tick Size reduction policy has been implemented, reduction in relative spread is significant. Stock with greater trading activity experienced greater spread reductions.

4) We are unable to confirm significant effect on Trade Time and Quote to Trade ratio.

5.2. POLICY IMPLICATIONS

From this research result, we could analyze how the Tick Size reduction policy impacts the IDX market. Unfortunately the expected impact could not be achieved. As IDX expect that tick size reduction could bring more liquidity to the market, the findings of this study prove that the Tick Size reduction only decreases the cost component as measured by the spread. But other liquidity factors such as volume, quote depth, trading activity and trade time does not increase as we IDX expected, on the other hand some component such as volume and quote depth has declined significantly. Declining in volume and quote depth might show that investor and trader see tick size component more like a profit discount rather than the trade cost. Although both represent in the tick size component but each perceptions (profit deduction or cost reduction) create different impact on investor behavior. If the investor believes that Tick Size reduction is such a cost reduction, they would submit more order as the cost is getting lower, they would think that by trading more, they can get more profit. On the other side, if investor judge the Tick Size reduction as a profit deduction, the will be two possible action of those investor. First they will try to compensate their profit deduction by sending more order, or second, they will substitute their

investment to other options, which could give more profit. The problem is the first option will only be applicable for institution investor or big investor who own large amount of capital. Small investor who possess limited capital will face difficulties to sending more order, as there's trading limit policy that may become barrier to enter more quote. And as the result although we could state that trade cost become lower after Tick Size reduction, but for trader or investor this cost saving and lot size reduction could not compensate the profit decline as a side impact of Tick Size change. And the consequence is investor sent lower quote size.

As changing the market instrument like Tick Size could have two different impacts on market liquidity. It becomes alert for exchange to do proper research and consider many things before changing the market instrument. As a stock exchange establish rule for providing liquidity, alternation to the market structure that improve the market liquidity provision capacity accommodate to make the exchange a more feasible entity. Our findings suggest that when considering rule changes such as changing the minimum Tick Size, regulators must consider the consequences and benefits of their policy changing action on liquidity providers.

Although some research might suggest that trading mechanism structure should consider the small investors benefit, but maximize the retail welfare is not simply by minimizing the quoted spread. Because lowering the cost or spread could mean reducing the profit

and become disincentive for the liquidity provider. While lowering the bid–ask spread reduces the trading cost for investors who submit market orders matched at the best quoted prices, this will also reduce the liquidity provider profits so that they are no longer willing to provide liquidity as much as before. The welfare implication here is because there is no significant increase in trading volume generated by smaller tick, the reduction in the effective spread following the new Tick Size rule implies that there is a wealth transfer from market makers to investor. Investors' savings in transaction costs came at the expense of market maker.

To answer the question "Does Indonesia Stock Exchange Need Tick Size Reduction?", Our findings suggest that lowering Tick Size now gives unexpected impacts to the exchange. Liquidity, esp. volume and trade time, do not show any improvement in those market parameters. For current situation, Tick Size reduction also is more preferable for stock that more actively traded. Moreover in order to set optimum tick price for each stock, we should consider the complete stock characteristic. An exchange could consider to change the Tick Size for stock with special characteristic, as in our finding suggestion, stock which is frequently traded would have lower spread. For inactive stocks would have a coarser price grid as an incentive for liquidity provision. And for active stocks, this Tick Size reduction rules allow to promote further reductions in transaction costs.

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국문초록

인도네시아 증권거래소 틱규모 감면 필요 여부에 대한 연구

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인도네시아 증권거래소는 2014 년 1 월 6 일부로 롯 규모(lot size)와 틱 규모(tick size)를 변경하는 새로운 정책을 도입하였다. 이 정책을 통해 인도네시아 자본시장에 더 큰 유동성을 생성하고 그 결과 인도네시아 증권거래소가 국가 경제 발전을 도모하기 위한 금융 재원과 투자 기회를 제공할 수 있게 될 것을 기대하고 있다. 본 연구는 호가 스프레드, 심도, 거래시간에 대한 외생적 틱 규모 감소가 인도네시가 증권거래소에 어떤 영향을 미치는 지에 대해 연구하고 있다. 표본 기간은 틱 규칙의 변화를 전후로 12 개월씩 총 24 개월이다. 인도네시아 증권거래소의 틱 규모 감소에 의한 영향은 다른 시장에서 일어난 것과 비슷한 것으로 조사되었다. 인도네시아 증권거래소의 틱 규모 감소는 스프레드, 볼륨, 시장심도의 감소와 관련이 있는 것으로 나타났다. 그러나 거래시간, 시세, 거래비율에 대한 통계적으로 유의미한 영향은 확인할 수 없었다. 회귀분석을 이용한 횡단면 분석에 따르면 틱 규모 감소 정책의 시행 이후 상대적 스프레드의 감소에서 통계적으로 유의미한 변화를 발생하였다. 거래 행위가 더 많은 주식일수록 스프레드 감소 또한 증가함을 알 수 있었다. 그러나 가치, 볼륨, 가격 변수에 대해서는 유의미한 영향을 발견하기 어려웠다.

키워드: 틱 규모, 마켓 스프레드, 시장 심도, 볼륨, 거래시간

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